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Gmelina arborea Promotion, Planting, Wood Processing and Product Marketing: Documentation of Best Management Practices Among Smallholder Farmers in Mindanao, the Philippines

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Abstract. *Gmelina arborea* (gmelina) is being grown by small landholders in Mindanao, the Philippines, as a result of an incentive programs initiated by the Local Empowerment Foundation. Trees for planting are provided to farmers, and repayment is one mature tree at harvest for every 10 trees that are established. Gmelina grows quickly in the region and is planted in agroforestry systems that include bananas, pineapples and other crops. The annual crops provide short-term income to the farmers as the gmelina trees develop. Trees are ready to harvest by age 7 or 8 years using portable sawmills. The wood is used for a number of products, the most valuable of which are moldings. The paper describes the incentive programs initiated to convince farmers to plant trees and the marketing efforts to sell the wood.

Key word: incentives, agroforestry, moldings

Resumen. La *Gmelina arborea* está siendo cultivada por pequeños agricultores en Mindanao, Filipinas, como resultado de un programa de incentivos iniciado por una Fundación para Potenciar a Personas Locales (Local Empowerment Foundation). La fundación le suministra los árboles a los agricultores para su plantación y la forma de pago es un árbol maduro por cada 10 árboles establecidos. Los árboles de gmelina crecen con rapidez y estos son plantados en sistemas agroforestales los cuales incluyen banano, piña, y otros cultivos agrícolas. Los cultivos anuales le suministran al agricultor ingresos a corto plazo, mientras los árboles de gmelina alcanzan su madurez. Los árboles pueden ser cosechados a los 7 ú 8 años de edad, utilizando aserraderos portátiles. La madera es utilizada para un número de productos, siendo las molduras el producto de mayor valor. En este artículo se describen los programas de incentivos iniciados para convencer a los agricultores para plantar árboles, y los esfuerzos de mercadeo que se están haciendo para vender la madera.

Palabras clave: incentivos, agroforestales, molduras

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Introduction

By the early 1980's, government planners, especially in the environmental sector, realized that the forest resources in the Philippines were dwindling at a very rapid rate. This was largely due to commercial logging, timber poaching and an influx of migrants to the upland regions of the country. As a result, the government promoted the massive planting of ipil-ipil (*Leucaena leucocephala*). This species was chosen largely as a result of the promising research and breakthroughs achieved by Dr. James Brewbaker at the University of Hawaii. The planting of ipil-ipil was disastrous because it is very susceptible to psyllid attack, and the wood quality is not suitable for the housing and furniture industry since the wood becomes brittle as it matures. The additional practice of monocropping ipil-ipil was probably one of the causes of the massive psyllid infestation.

After the ipil-ipil debacle, the government promoted a massive-scale planting of *Gmelina arborea* (gmelina) in a number of programs for small-scale farmers (Integrated Social Forestry, Family Approach to Reforestation). This promotion also extended to large planting systems such as the Industrial Forestry Management Agreement, and the Community-based Forest Management Agreement, as well as traditional forest plantations.

Gmelina arborea was seen as the best alternative for the following reasons: a) it did not appear susceptible to diseases and to date no record of massive infestation has occurred in Mindanao, b) it grows very well even in poor soils, c) when planted at close spacing, it is self-pruning and saves the farmer precious time in management, and d) most importantly, it matures quickly. The wood is easy to work with and even unseasoned wood does not warp easily when used in the furniture and housing industry. Our experience is that a gmelina tree contains high quality wood and is ready for harvest at an age of 7 years.

Promotion Process

The major emphasis in the promotion process is to encourage small farmers to grow gmelina. This is because they are generally the last to be reached by government programs, they only have marginal resources, and they are often the most destructive in the sense that they seldom practice soil and water conservation measures. However, if they can be encouraged to grow trees, they represent a vast resource to the Philippine economy and will reduce the pressure on the native forests. In Mindanao, a farmer usually owns about three hectares of land that can be utilized for gmelina planting either as windbreaks, boundary markers, shade tree establishment, or reforestation on very hilly sites not suitable for crop production.

The challenge is encouraging resource-poor farmers to grow gmelina. The usual response by farmers is, "Can we eat the gmelina that we grow?", "There is very little space on my land", "I don't have the capital to use", " I cannot wait seven years to harvest the trees", among others. Recently, an initiative implemented in Libertad and

Initao, Province of Misamis Oriental in Mindanao, is making some breakthroughs with the local farmers. The simple solution is crop diversification that allows for crop development between the rows or under the canopy of gmelina.

As an example, a two-hectare unproductive agricultural area located in Libertad was transformed into a fully productive farm planted mainly with gmelina and intercropped with bananas, pineapple and squash. These crops provide short-term income and help defray establishment expenses. Gmelina is grown extensively and will be harvested on a 7-year cycle. Spacing in the plantations is 2 x 2 m. Culling of bent, diseased and deformed trees is done every 2 years. The poles of gmelina are sold to banana and papaya planters to be used as props for their young plants. The interplay of sunlight, water and soil is given importance. In this way, the farm becomes a sustainable, stable, productive area. The core idea is to demonstrate to the farmer the provision of steady income on a long-term basis. Once the farmers see that the system will provide sustained income for their families, they are willing to grow trees.

Successful agroforestry systems must integrate the knowledge of forestry and agriculture in such a way that it is useful for the local farmers. To promote successful agroforestry, a small pig and goat pen is placed in a corner of the farm for manure production. Sawdust is used as flooring and, when mixed with manure in a natural process, produces a high-grade organic fertilizer. A 3 x 4 m pen with 3 to 4 pigs can produce 30 sacks of fertilizer every 6 months. Chickens are free-ranging Honduras and native breeds. During the planting of gmelina, a gallon-sized hole is dug in the ground and manure is placed in the bottom. As the gmelina trees grow they are trimmed regularly, and also bananas are cleaned of dead leaves. These leaves are left to rot in the ground providing humus to the soil. Gmelina roots "draw" minerals deep in the soil and produce tremendous amounts of leaves and twigs ideal for humus building in poor soils.

To further promote planting of trees by small farmers, support has been initiated to provide them with seedlings and technical assistance. Seedlings of gmelina are provided on a simple repayment package: for every 10 trees planted, farmers would need to pay one tree at harvest. During the 3rd year of growth, we select the trees to be used as repayment and mark them accordingly. A simple agreement in the Cebuano dialect is signed at the outset. Technical assistance covers the care and management of small animals, tree spacing, crop-tree mixes, disease control, pruning, and fire control.

As part of the incentive to grow gmelina, a wood-processing project has been established that allows for the development of markets for mature gmelina trees. Some farmers sell all their trees at one time while others sell their trees only when they need cash. In this way, the money derived from growing trees can serve to supplement their daily cash needs. The wood-processing project, located in Libertad, was begun in 2000 and employed four workers. At the beginning of 2003, it employed 18 people who work as drivers, saw millers, haulers, carpenters and chainsaw operators. The wood-processing project produces lumber for housing needs, high-grade moldings, balusters, school and office furniture and small decorative items. It has supplied school furniture and pre-fabricated latrines to a European Union (EU) funded rehabilitation project in Lanao del

Norte and jambs and jealousies to the Habitat for Humanity Project in Cagayan de Oro. A marketing outlet for wood products has also been opened in Initao, Misamis Oriental and Iligan City. The proceeds from the project are used to expand seedling production, increase wood inventory and to provide technical assistance to new farm cooperators.

Aside from helping local farmers, the gmelina project has been the venue for the training of 28 staff and cooperators of the National Power Corporation (NPC) watershed management division. The Technical Education and Skills Development Authority (TESDA) has already shown interest in providing funds for the training of 75 local youth and artisans in basic carpentry.

International support for our efforts is slowly growing. The German Doctors for Developing Countries based in Frankfurt is providing us with funds to establish a seedling nursery and to do promotional extension work with farmers. We are also negotiating with the Tropical Forest Fund of the UNDP-EU to provide funding to support an expansion area in neighboring province.

Cultural Management

The cultural management for the raising and planting of gmelina follows a very strict regimen since it is known that good trees come from good progeny and robust seedlings. The basic requirement is the selection of healthy, well-formed parent trees where seeds are gathered to be sown in the nursery. The nursery that is maintained by the project is located near the river, which is already well drained with good soil structure. The sand near the riverbank is used for growing media. No inoculation of mycorrhizae is done. The nursery beds are covered with coconut palms to provide shade, which are easy to remove little by little as the seedlings mature. Gmelina seedlings mature and are ready to plant in three months and farmers prefer the younger seedlings compared to the older ones since gmelina wilts easily if the roots are moved during planting. A three-month-old seedling usually has its roots still inside the polyethylene bag and little disturbance is made during the transplanting process. Seedlings are planted in the field at the beginning of the rainy season and 90% survival is achieved.

Field management of gmelina is simple since the tree grows quickly. A one-year-old gmelina tree can average 1.7 m in height and thereby easily outpaces the invasion of cogon (*Imperata cyclindrica*), an insidious weed that can easily suffocate slow growing plants such as mahogany (*Swietenia macrophylla)*. During the first year of growth, a bi-annual ring weeding is conducted followed by annual ring weeding thereafter. Bent and deformed trees are cut as necessary. As mentioned, gmelina is resistant to disease and pest infestation and control is unnecessary.

At harvest time, which is during the 7^{th} and 8^{th} year, either selective harvesting or clear cutting is done. Care must be taken so as not to disturb or destroy neighboring plants such as bananas, vegetables and other crops. This is done by cutting the crown of the gmelina trees first and then working downwards to the base. The first or second cuts

remove 1.3 to 1.7 m of the topmost crown and the lowest cut is about 2.7 m in length. The branches are tied in bundles to be sold as firewood in small restaurants and bakeries. Wood seasoning is done in the open air and uses the FIFO (first in, first out) method.

Processing the gmelina into marketable grade lumber is a science in itself. Our processing machine is a portable wood framing, blade and prime mover type of machine. The milling equipment works well because it can be easily installed where the gmelina wood supply is located. Usually the sawmill operator determines what final cuts and grade are to be produced per piece of timber. The wood is first examined and then various slices are produced for moldings, panels, sticks and reject pieces. The wood for moldings is selected from prime wood that is unblemished and knot-free. Wood moldings command a high price compared to other products. Lumber that is not well formed is rejected and is being used to repair temporary houses and to make boxes and packaging materials.

In terms of marketing products produced from gmelina, there are two modes being employed, a) maintaining a market outlet in the city (Iligan) and b) supplying wood and products to hardware stores and other outlets. Buyers also sometimes go directly to the saw milling area to buy products since they can have a wide selection.

Recommendations and Conclusions

Several lessons can be gleaned from these initiatives to promote small landholders to grow gmelina trees,

1. Resource-poor farmers follow what they see and what they perceive as economically beneficial to them. They are usually the most difficult to convince to adopt new technology, given their very narrow economic base and lack of resources. Clear and practical examples must be given to the farmers to encourage them to plant gmelina and demonstration plots are important so that they can see the results with their own eyes.

2. Gmelina offers the most practical and economical alternative to other forest species for the housing, furniture and firewood industry in the Philippines. The most important traits are quick growth and early maturity, good wood quality and workability. These small plantings of gmelina take pressure off the remaining natural forest resource, as well as provide resource-poor farmers with income.

3. The support and cooperation of multiple stakeholders such as the government, donors, local leaders and the common people are necessary for the success of any initiative.

4. While this initiative is focused on individual farmers, it is also advantageous to target local traditional groups for maximum impact and result.

In our area, we have already planted a total of 275,000 gmelina trees since we started 7 years ago, distributed in farms mainly in the provinces of Misamis Oriental and Lanao del Norte. Our target for the next 5 years is to plant 500,000 more seedlings. There are no data regarding the total area planted to gmelina in the entire Mindanao area.

The future is promising for gmelina-based enterprises because of the reasons discussed in the second conclusion above, because wood from natural growth forests are already very severely limited, and because government regulation is very strict.